



Product Guide

September 2011

IBM System x3100 M4

Product Overview

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Outstanding price/performance in a value tower server

Suggested uses: Retail/kiosks, and SMBs, looking for file and printer servers, Web serving, small business infrastructure, and virtual desktops for small workgroups.

Often small-to-medium sized businesses have limited IT budget and resources, and rely on partners or multitasking employees to help manage the company's network. Business needs for efficiency improvement and retention of critical data require the use of a server that is easy to get up and running quickly and is dependable. You need to squeeze as much as possible out of your IT dollars, while saving cost on features not needed in an SMB environment. The IBM® **System x3100 M4** is an ideal first server to meet those business needs. It was built for speed, yet eliminates costly design features found in general-purpose servers that are unnecessary for smaller businesses.

The single-socket x3100 M4 supports the latest **quad-core Intel® Xeon®**, **dual-core Core i3®**, and **Pentium®** processors, to offer impressive computing power in a **minitower** design that can fit under a desk. It offers up to **32GB** of industry-standard enterprise-class **1333MHz DDR3** UDIMM memory with **ECC** (Error Checking and Correcting) protection—for high performance and reliability. **Dual** integrated high-speed **Gigabit Ethernet** controllers are standard, as are **four** high-performance/low-latency **PCIe** adapter slots.

All models offer impressive scalability for an entry server, including an internal storage capacity of up to **12TB** (via **four** enterprise-class **3.5-inch simple-swap 3TB SATA II** HDDs). Optional IBM ServeRAID® adapters provide additional RAID support and greater performance for internal SATA HDDs. For data backup, the x3100 M4 supports internal or external **tape drives** or an **RDx Removable Disk Cartridge** drive. Also, the minitower chassis is optionally convertible to a **4U** rack server.

The x3100 M4 is compliant with **80 PLUS®** standards (model dependent), demonstrating exceptional energy efficiency.

Standard in the x3100 M4 is an **Integrated Management Module** version 2 (**IMM2**) that enables users to manage and control the server easily. The built-in, **externally viewable light path diagnostics panel** enables quick servicing of the system if a problem develops. These advanced features help maximize network availability by increasing uptime, as do **temperature-controlled fan with Calibrated Vectored Cooling™** and industry-standard **IPMI 2.0** support, including **highly secure remote power control**.

Unified Extensible Firmware Interface (**UEFI**) is an evolutionary leap over legacy BIOS. UEFI provides a more intuitive user interface and understandable event logs and better management. This high level of manageability is designed to keep costs down and the system up—even when network usage increases.

With the inclusion of unique IBM service and support features such as **light path diagnostics**, **IBM Systems Director**, **IBM ServerGuide™** and the IMM, the x3100 M4 is designed for superior uptime.

If you need single-socket, quad- or dual-core computing price/performance and vast internal storage in a budget tower/rack package, the x3100 M4 is the ideal system.

Selling Features

Price/Performance

The x3100 M4 offers numerous features to boost performance and reduce product and operating costs:

- The choice of a low-cost **dual-core Core i3** processor or a robust **server-class quad-core Xeon** processor offers a range of performance at ultralow prices..
- **Energy-efficient 20-65W processors** draw less power and produce less waste heat than high-wattage processors, thus helping to reduce your energy costs.
- Ultra-fast server-class **1333MHz PC3-10600 DDR3 ECC** memory provides up to **50%** higher memory throughput and lower latency than DDR2 memory, while consuming up to **15%** less energy.
- **Four high-performance/low-latency PCIe adapter slots** offer investment protection by supporting high-performance adapters, such as 10Gb Ethernet, Fibre Channel, and InfiniBand™ cards.
- Standard **ServeRAID C100** for IBM System x provides integrated software **RAID-0/1/10** for no

additional cost on the x3100 M4.

- Optional integrated **hardware RAID-0/1/10/5/6** support offers improved performance and/or redundancy, but doesn't consume a valuable adapter slot.
- Up to **four** (model-specific) 3.5-inch enterprise-class **SATA II** hard disk drives offer terrific price/performance (incorporating up to **6Gbps** throughput).
- The two integrated single-port **Gigabit Ethernet** controllers with **IPMI 2.0** support provide high-speed network communications.
- A **high degree of device integration**—including the SATA, systems management, video, dual Gigabit Ethernet, and standard or optional RAID controllers, along with optional embedded hypervisor, lowers costs and frees up valuable adapter slots.
- Energy-efficient components, including DDR3 memory and power supplies that are up to **90%** efficient (model-specific), help keep your energy bills down. Because of these features, the x3100 M4 achieved the **80 Plus Bronze** standard for energy efficiency.

Flexibility

The x3100 M4 has the ability to grow with your application requirements, thanks to:

- A choice of quad- or dual-core processors, including **2.2 to 3.5GHz Xeon E3**, or **3.1 or 3.3GHz Core i3**, processor with **20 to 95W** maximum power draw, and **1333MHz** memory access.
- Up to **32GB** of high-speed **DDR3** system memory in **four** DIMM sockets.
- **Up to four available high-performance PCIe** slots (model-specific) in all models.
- Up to **four** internal **3.5-inch** fixed **SATA II** HDDs offer low-cost/high-capacity enterprise-class storage. The 3.5-inch drives provide a maximum of **3TB** apiece of internal storage.
- An **available 5.25-inch** drive bay supports either a **half-high tape drive** or an **RDX Removable Disk Cartridge** drive, for cost-effective data backup. A **dedicated 3.5-inch drive** is reserved for an optical drive.
- The **seven USB 2.0** ports are up to **40X** faster¹ than older **USB 1.1** ports. This provides speedy access to external HDDs (non-arrayed), optical drives, tape drives, and other USB devices. Two ports are on the front of the unit and four are on the back. In addition, there are **two internal** USB 2.0 port for use with a **tape drive, RDX Removable Disk Cartridge** drive, or USB flash drive containing a **hypervisor**.

Manageability / Security

Powerful systems management features simplify local and remote management of the x3100 M4:

- The x3100 M4 includes an **Integrated Management Module** version 2 (**IMM2**) to monitor server availability, perform Predictive Failure Analysis, etc., and trigger **IBM Systems Director** alerts.
- Integrated industry-standard Unified Extensible Firmware Interface (**UEFI**) next-generation BIOS. New capabilities include:
 - Human readable event logs — no more beep codes
 - Complete out-of-band coverage by the Advance Settings Utility to simplify remote setup
 - A complete setup solution, allowing adapter configuration functions to be moved into UEFI
 - Consistent firmware management across an entire product line
- Integrated **Trusted Platform Module (TPM) 1.2** support for increased security.
- **IBM Systems Director** is included for proactive systems management. IBM Systems Director comes with a portfolio of tools, including **IBM Systems Director Active Energy Manager**, **IBM Service and Support Manager**, and others. In addition, IBM Systems Director offers extended systems management tools for additional server management and increased availability. When a problem is encountered, IBM Systems Director can issue administrator alerts via e-mail, pager, and other methods.
- **IPMI 2.0** supports highly secure remote system power control using data encryption. This allows an administrator to restart a server without having to visit it in person, saving travel time and getting the server back up and running quickly and securely. It also adds new features beyond those provided by IPMI 1.5, including **VLAN** support, **Serial over LAN**, enhanced authentication and encryption algorithms (**RMCP+** and **AES**) and a **firmware firewall**.

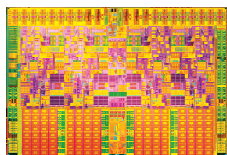
¹ Data transfer rates may be less than the maximum possible.

Availability and Serviceability

The x3100 M4 provides many features to simplify serviceability and increase system uptime:

- **Server-class components**, including the processor, memory, chipset, power supply, and others, are built for the rigors of an “always-on” environment. This helps reduce the risk of failure and life cycle costs, versus using a PC as a server.
- **ECC memory** provides error correction not available in PC-class “servers” that use parity memory. Avoiding system crashes (and data loss) due to soft memory errors can mean greater system uptime.
- **Toolless cover removal** provides easy access to upgrades and serviceable parts, such as HDDs and memory. Similarly, an optional ServeRAID controller can be installed and replaced without tools. This can mean less time (and therefore less money) spent servicing the x3100 M4.
- **Temperature-controlled fan** adjusts to compensate for changing thermal characteristics. At the lower speeds it draws less power and suffers less wear. Also important in an office environment, temperature-controlled fans produce less ambient noise than if they were constantly running at full speed.

Key Features



High-Performance Processors

The x3100 M4 supports a choice of one high-performance Intel **Xeon E3** or **Core i3** processor, as the performance needs of your business dictate. The x3100 M4 offers a choice of processor clock rates, cache sizes, and power draw:

- **80W quad-core Xeon E3** models **1270** or **1220**, running at 3.4 or 3.1GHz (respectively), with reduced power draw and excellent performance/watt (only **20W** per core), **8MB** of L3 processor cache, **1333MHz** memory access, 2 threads per core, and Intel Turbo Boost technology
- **65W dual-core Intel Core i3** model **2100** running at 3.1GHz, with low power draw and good performance/watt (only **32.5W** per core), **3MB** of L3 processor cache, and **1333MHz** memory access
- **65W dual-core Intel Pentium** model **G850** running at 2.9GHz, with low power draw and good performance/watt (only **32.5W** per core), **3MB** of L3 processor cache, and **1333MHz** memory access

Also available, via configure-to-order (CTO):

- **95W quad-core Xeon E3** model **1280**, running at 3.5GHz, with reduced power draw and excellent performance/watt (only **23.75W** per core), **8MB** of L3 processor cache, **1333MHz** memory access, 2 threads per core, and Intel Turbo Boost technology
- **80W quad-core Xeon E3** models **1240**, or **1230**, running at 3.3 or 3.2GHz (respectively), with reduced power draw and excellent performance/watt (only **20W** per core), **8MB** of L3 processor cache, **1333MHz** memory access, 2 threads per core, and Intel Turbo Boost technology
- **45W quad-core low-voltage Xeon E3** models **1260L**, running at 2.4GHz, with excellent power draw and performance/watt (only **11.25W** per core), **3MB** of L3 processor cache, **1333MHz** memory access, 2 threads per core, and Intel Turbo Boost technology
- **20W dual-core low-voltage Xeon E3** models **1220L**, running at 2.2GHz, with excellent power draw and performance/watt (only **10W** per core), **3MB** of L3 processor cache, **1333MHz** memory access, 2 threads per core, and Intel Turbo Boost technology
- **65W dual-core Intel Core i3** models **2130** or **2120** running at 3.4 or 3.3GHz, respectively, with low power draw and good performance/watt (only **32.5W** per core), **3MB** of L3 processor cache, and **1333MHz** memory access
- **65W dual-core Intel Pentium** models **G860** or **G840** running at 3.0 or 2.8GHz, respectively, with low power draw and good performance/watt (only **32.5W** per core), **3MB** of L3 processor cache, and **1333MHz** memory access
- **65W dual-core Intel Pentium** models **G630** or **G620** running at 2.7 or 2.6GHz, respectively, with low power draw and good performance/watt (only **32.5W** per core), **3MB** of L3 processor cache, and **1066MHz** memory access

The **dual-core** processors contain **two complete processor cores**; **quad-core** processors, similarly, contain **four** cores. The processors also contain one shared cache. The shared cache is dynamically allocated among cores as needed. The cores appear to software as physical processors. The two-core processors offer considerably higher performance than a same-speed processor with a single core. Likewise, four-core processors offer considerably higher performance than a same-speed processor with two cores.

1333MHz memory access offers up to **9%** higher throughput at the same processor clock speed than **1066MHz** memory access.

Turbo Boost Technology increases performance by translating the temperature, power and current head room into higher frequency. It will dynamically increase by 133MHz for short and regular intervals until the upper limit is met or the maximum possible upside for the number of active cores is reached. The maximum frequency is dependent on the number of active cores. The amount of time the processor

spends in the Turbo Boost Technology state depends on the workload and operating environment, providing the performance you need, when and where you need it.

In processors implementing **Intel Hyper-Threading Technology**, each core has two threads capable of running an independent process. Thus, a 6-core processor can run **12** threads concurrently.

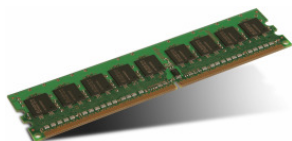
Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.

Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.

High-Performance, Low-Latency DDR3 ECC Memory

The x3100 M4 ships with one DIMM installed and supports up to **32GB** of Unbuffered DIMM (**UDIMM**) memory in **4** sockets. It uses **PC3-10600** double data rate III (**DDR3**) memory operating at **1333MHz** for fast access, and provides ECC memory protection.

The x3100 M4 supports either **1**, **2**, or **4** UDIMMs. When 2 or 4 DIMMs are installed, memory operates in **two-way interleaved** mode for increased performance. **UDIMMs** are available in kits consisting of *one 1GB DIMM or two 1GB, 2GB, 4GB or 8GB DIMMs*. The x3100 M4 supports both single- and dual-rank UDIMMs. RDIMMs and non-ECC memory are not supported. The x3100 M4 supports both single- and dual-rank UDIMMs. **RDIMMs** and non-ECC memory are **not** supported.



Drive Bays

The x3100 M4 contains **six** drive bays in total, including **four 3.5-inch** bays that support fixed **SATA II** drives and **two 5.25-inch** bays that support optical or tape drives. The HDD bays support slimline (1.0") drives, totaling up to **12TB** per system, respectively.

A **5.25-inch** bay contains a half-height **DVD-ROM** drive, with a SATA interface, upgradeable to a **DVD-RW** drive. A **second 5.25-inch** bay is available for a **half-height tape** drive, or an **RDx Removable Disk Cartridge** drive. An optional *external* USB floppy drive may be used, if needed.

Like hot-swap drives, simple-swap drives may be inserted or removed through the front of the server. Unlike **hot-swap** drives, **simple-swap** SATA drives *do* require powering off the system first; however, no tools or jumpers are required for installation and removal, allowing for faster, simpler servicing than fixed drives.

For still more storage, a direct-attach, iSCSI, or SAN external expansion option can be added, using an optional controller.



Large HDD Storage Capacity

The x3100 M4 supports up to **four 3.5-inch** fixed **SATA II** drives:

- **7,200 RPMs** —250 or 500GB, 1 or **3TB** (**12TB** maximum capacity)

Note: Enterprise-class 500GB+ SATA drives offer higher reliability and higher performance than lower-capacity SATA drives.



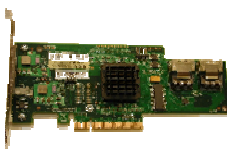
Disk Controllers

All x3100 M4 models include an integrated SATA II controller in the system chipset. It provides data transfer speeds of up to **3Gb** per second² across the SATA bus for up to **four 3.5-inch** internal Serial ATA (**SATA**) drives. In addition, the x3100 M4 includes **RAID-0/1/10** support in software, via the **ServeRAID C100** for System x. This provides the advantages of RAID at no additional cost, although without the performance boost of hardware RAID.

The serial design of the SATA bus allows maximum performance to be maintained as additional drives are added.

Optional RAID controllers include:

- The **6Gbps (x8 PCIe) ServeRAID-M1015 SAS/SATA** controller, which supports **RAID-0/1/10** (no cache) for up to 4 drives (system limit). The **IBM ServeRAID M1000 Series Advance Feature Key** adds **RAID-5/50** support.
- The **6Gbps (x8 PCIe) ServeRAID-M5014 SAS/SATA** controller, which offers enhanced performance with **256MB** of cache memory, and supports **RAID-0/1/10/5/6** for up to 4 drives (system limit).



High-Performance Adapter Slots

The x3100 M4 provides **four PCIe Gen 2** adapter slots standard. **PCI Express** Gen 2 is the next generation of high-performance, low-latency, serial I/O bus. **Slot 1** is a **x16** ("by 16") physical / **x8**



² Data transfer rates depend on many factors and are often less than the maximum possible.

electrical slot. This means that although the slot runs at **x8 Gen 2** speeds (**8GBps**), it can accept a x16 Gen 1 or Gen 2 adapter in the slot. It is also capable of supporting **x1/x4/x8** Gen 1 or Gen 2 adapters at full speed. **Slot 2** is a **x8/x8 (8GBps)** slot. **Slot 3** is a **x4 (4GBps)** slot and **Slot 4** is a **x1 (1GBps)** slot. All slots are **full-length/full-height**. In addition,

Internal Backup

The x3100 M4 supports internal **half-high backup** options. Supported technologies include:

- **DDS-6** (internal USB)
- **RDX Removable Disk Cartridge** (internal or external USB)
- **IBM Half-High 400/800GB LTO-3** (SAS)
- **IBM Half-High LTO-4** (SAS)

External tape backup support is available using the optional IBM 3Gbps SAS HBA v2 controller.

Gigabit Ethernet Controller

The x3100 M4 includes two integrated **single-port** Broadcom **BCM82574** Gigabit Ethernet controller for up to 10X higher maximum throughput than a 10/100 Ethernet controller.

It also supports **Wake on LAN®** and **PXE** (Preboot Execution Environment) flash interface. Optional PCI adapters offering failover and load balancing between adapters are available for added throughput and increased system availability.

Light Path Diagnostics

Light path diagnostics enables a technician to quickly identify and locate a failed or failing system component. This enables quick replacement of the component, which helps increase server uptime and lower operating costs.

The light path diagnostics LED on the front of the server alerts the administrator without the need to open the server cover (or remove the server from a rack). The LED tells the servicer that an internal component requires attention. In addition, many components have their own identifying LEDs. For example, each of the four memory modules has an LED next to the socket, as do all adapter slots, the fan, and the service processor, allowing the servicer to easily identify exactly which component needs servicing. By following the “light path,” the component can be replaced quickly, and without guesswork. (**Note:** In the event of a failed DIMM, the system will restart and mark the DIMM as bad while offline, thus allowing the system to continue running, with reduced memory capacity, until serviced.)

Efficient Cooling

A strategically located fan, combined with efficient airflow paths, provide highly effective system cooling for the x3100 M4, known as **Calibrated Vektored Cooling**. The server includes one non-hot-swap fan. In addition, the power supply contains a fan.

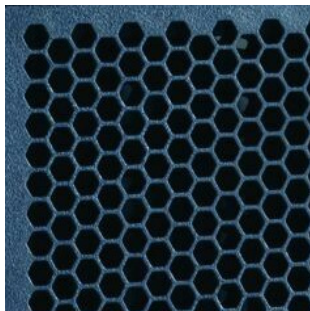
The fan automatically adjusts speeds in response to changing thermal requirements, from minimum RPMs to maximum RPMs, depending on the internal temperature. When the temperature inside the server increases, the fan speeds up to maintain the proper ambient temperature. When the temperature returns to a normal operating level, the fan returns to its default speed. Why not simply run the fan at 100% capacity all the time? For several good reasons: to reduce the ambient noise, reduce the wear-and-tear on the fan and reduce the server power draw. The reduction in ambient noise and power draw may be relatively minor for a single server, but put several in an office and it can make a significant difference.

In addition, the server uses **hexagonal ventilation holes** in the chassis. Hexagonal holes can be grouped more densely than round holes, providing greater airflow through the system cover.

This cooling scheme is important because newer, more powerful processors generate a significant amount of heat, and heat must be controlled for the system to function properly.

Other Features

- **Eight USB 2.0 ports** — Provides flexibility to add high-speed external devices. The USB 2.0 specification supports up to 480Mbps transfer rates. (**Note:** Not all USB 2.0 devices are capable of achieving this rate.) **Two** ports are provided on the front of the server and **four** on the back. In addition, **two internal** ports are available to support a USB tape drive, RDX Removable Disk Cartridge drive, or USB flash drive containing a hypervisor.
 - **Toolless chassis** — The cover can be opened without tools and many components can be added, removed, and replaced without tools, including DIMMs, the processor, an optional ServeRAID controller, the optical drive and PCIe adapters. This can save significant servicing time.
-



Extensive System Support Features

The IBM services and technical support portfolio provides world-class, consistent, high-quality service and support. The x3100 M4 server offers a number of tools and services designed to make ownership a positive experience. From the start, IBM programs make it easier for you to plan for, configure and purchase System x servers, get them running and keep them running long-term. These features include IBM ServerGuide, IBM ServerProven® and extensive technical support offerings.

IBM **ServerGuide** (installed from CD) simplifies the process of installing and configuring System x servers. ServerGuide goes beyond mere hardware configuration by assisting with the automated installation of the Microsoft® Windows® Server 2003 and 2008 operating systems, device drivers and other system components, with minimal user intervention. (Drivers are also included for support of Novell NetWare, Red Hat Linux and SUSE LINUX.) This focus on deployment helps you reduce both you total cost of ownership and the complexity that administrators and technical personnel face.



The IBM **ServerProven** program provides the confidence that specific options and operating systems have been tested on the server and are officially supported to work together. It is updated frequently to ensure that the latest compatibility information is always at your customers' fingertips.

IBM offers extensive **technical support** by phone and via the Web. Support options include links to forums/newsgroups, problem submission, online shopping support, service offerings, device drivers for all IBM product lines, software downloads and even upcoming technical seminar worldwide schedules and registration. Also available are remote installation, configuration and usage support for System x hardware and software, as well as onsite custom services to provide the level of expertise you require.

IBM Maintenance and Technical Support solutions can help you get the most out of your IT investment by reducing support costs, increasing availability and simplifying management with integrated support for your multiproduct, multivendor hardware and software environment. For more information on hardware maintenance, software support, solution support and managed support, visit <http://ibm.com/services/maintenance>.

Advanced Systems Management Capabilities

The x3100 M4 has a high level of systems management capabilities that are well-suited to remote locations as well as to stand-alone environments. Features include UEFI, IMM, IBM ToolsCenter, Automatic Server Restart, Wake on LAN® support, PXE support, text console redirect, Predictive Failure Analysis, and IBM Systems Director.

The **IMM2** provides industry-standard **Intelligent Platform Management Interface (IPMI) 2.0**-compliant systems management. It provides a number of important system functions, including:

- Monitoring of system and battery voltage, system temperature, fans, power supplies, processor and DIMM status
- Fan speed control
- Product ID and Family ID detection
- Highly secure remote power on/off
- System reset control
- NMI/SMI detection and generation
- System diagnostic LED control (power, HDD, activity, alerts, heartbeat)
- IPMI over LAN
- Serial Over LAN
- Proxy server support
- LAN messaging and alerting
- Text console redirection over LAN
- Predictive Failure Analysis for system fans
- Enhanced authentication and encryption algorithms (RMCP+ and AES)
- VLAN support
- Local update of IMM2 firmware
- Firmware firewall
- Support for IPMI v2.0 compliant management software (e.g., xCAT)
- Other mandatory and optional IPMI functions

The IMM2 alerts IBM Systems Director to anomalous environmental factors, such as voltage and thermal conditions.

IBM **ToolsCenter** consolidates 42 needed tools for managing servers individually into an integrated suite of 8 tools. They are organized by function: deployment, updates, configuration and diagnostics.

Tools are now simpler to access and use with a single webpage for access, a common look and feel and a common command line interface for the scripting tools. The ToolsCenter **Bootable Media Creator** offers significantly more functionality than past tools with the ability to add more tools to the bootable image and to automatically download the bootable environment if needed. Bootable Media Creator allows you to create bootable CDs, DVD, and USB keys for updates customized to your systems.

Automatic Server Restart (ASR) helps reduce downtime by restarting the server automatically in the event of a system lockup. ASR technology is a combination of hardware circuitry tied into the server's system reset function and a device driver. As long as the server continues running, the ASR watchdog timer will keep being reset, but if the operating system crashes or the hardware freezes somehow the ASR software will be unable to reset the hardware timer. If the timer is not reset within five minutes, it automatically triggers the ASR hardware, which immediately restarts the server (and logs an ASR event). These features are designed so that *no more than five minutes can pass before the server is restarted*.

Unified Extensible Firmware Interface (**UEFI**) is an evolutionary leap over legacy BIOS. UEFI provides a more intuitive user interface and understandable event logs and better management. This high level of manageability is designed to keep costs down and the system up—even when network usage increases. Capabilities include:

- Human readable event logs — no more beep codes
- Complete out-of-band coverage by the Advance Settings Utility to simplify remote setup
- A complete setup solution, allowing adapter configuration functions to be moved into UEFI
- Consistent firmware management across an entire product line

Text Console Redirection support allows the administrator to remotely view x3100 M4 text messages over serial or LAN.

Wake on LAN permits the server to be remotely powered on if it has been shut off. Once powered up, the server can be controlled across the network, using the **Preboot Execution Environment (PXE)**.

Like Wake on LAN, **PXE** is system firmware. It enables software such as the optional **IBM Remote Deployment Manager** to take control of a system before the BIOS, operating system or applications are loaded (using Wake on LAN/PXE) and lets an administrator perform many low-level tasks remotely that would otherwise require a visit to each system. These tasks may include such things as formatting a hard disk drive, updating system firmware, or deploying a Windows or Linux operating system.

Predictive Failure Analysis (PFA) is designed to allow the system to detect impending failure of supported components (processors, memory, HDDs, power supplies and fans) *before* actual failure, and alert the administrator through IBM Systems Director. This gives you the ability to *replace* the failing component *before* it fails, resulting in increased uptime. **IBM Systems Director** software for advanced workgroup management is included with the x3100 M4. IBM Systems Director comes with a portfolio of tools, including **IBM Systems Director Service and Support Manager**, and others. Others are available as add-ons for additional server management and increased availability. IBM Systems Director provides a single uniform graphical interface for all of these systems management functions.

IBM Systems Director enables you to customize thresholds and monitor system components (for things like temperature, voltage regulation, etc.) to help maximize uptime.

Key Options

IBM options for System x servers help you take your servers to a higher level

You can rely on System x options to supply a complete solution for your business needs. Options help create an optimized server system to meet your data protection, storage and availability needs. Every IBM option is designed and tested for peak performance and flexibility, helping to maximize your return on investment. The combination of System x servers and options lets you keep your fingers on the pulse of your e-business.

Memory — Memory is a significant factor in systems application performance. Adding more memory to a System x server is one of the most effective ways to increase application performance. For best performance in a server with a quad-core processor, there should be twice as much memory available as for a dual-core processor. The x3100 M4 provides two-way interleaving.

Hard Disk Drives — IBM hard disk drives help you improve the transaction and cost performance of your System x servers. The choice of hard disk drives can be a critical aspect of maximizing the I/O throughput of the system. **SATA II** hard disk drives are available for the x3100 M4 with capacities up to **3TB** (3.5-inch) apiece at **7,200 RPMs**.

IBM ServeRAID Controllers — System x servers using ServeRAID technology allow companies to build a reliable foundation for business-critical computing. IBM ServeRAID technology allows an array consisting of multiple physical hard disk drives to be treated as one logical drive. ServeRAID technology also allows data to be stored redundantly, across multiple hard disk drives—enhancing both the integrity and the availability of the data. SAS and SATA ServeRAID controllers offer enhanced performance due to onboard processors and cache. Because IBM ServeRAID controllers can help

significantly improve data transfer rates, this technology is extremely effective when implementing demanding, transaction-oriented applications. By employing the advanced fault tolerance of IBM ServeRAID technology, companies can effectively implement networked business systems that require large amounts of storage space for data and applications that must be available for their businesses to continue operating.

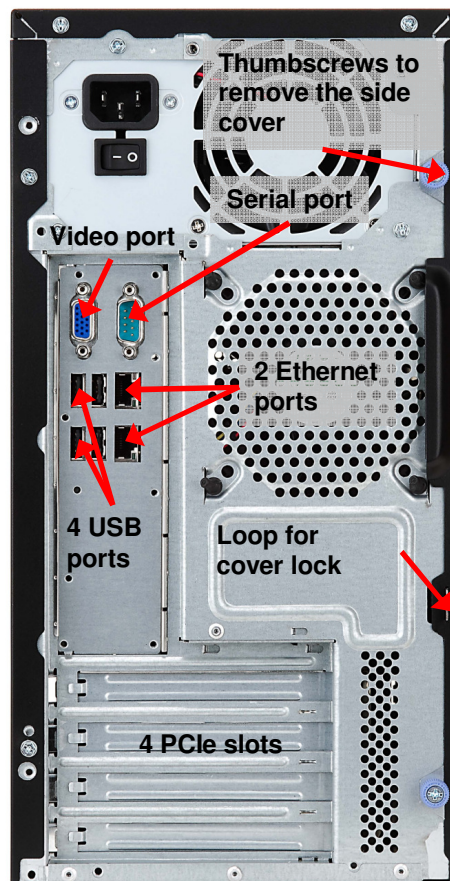
The **ServeRAID-M1015**, x8 PCIe and **6Gbps**, offers RAID-0/1/10; optionally RAID-5. The **ServeRAID-M5014**, x8 PCIe and **6Gbps**, provides **256MB** cache and RAID-0/1/10/5/50³; optionally RAID-6/60). The **ServeRAID M1000 Advance Feature Key** adds RAID-5/50 support to the ServeRAID-M1015.

x3100 M4 Images

Front View



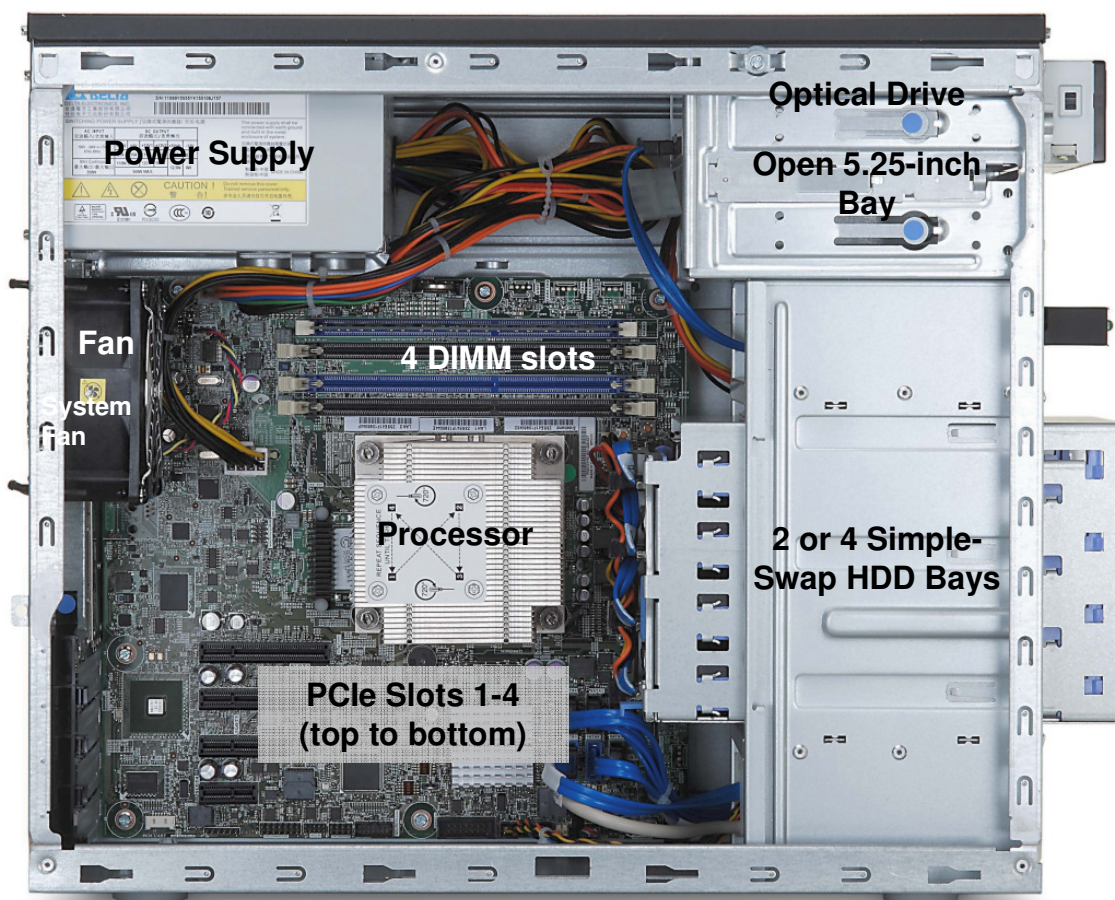
Rear View



³ Although the adapters support RAID-0/1/10/5/50/6/60, the four-drive models are limited by available drive bays to RAID-10/5/6. RAID-5 and -6 require three or four bays, respectively, available via CTO. RAID-10, -5 and -6 are not available in two-drive models. RAID-50/60 requires six or eight drives, respectively, which are not available in the x3100 M4.

Outstanding value in a high-performance single-socket tower server

Interior View



x3100 M4 Specifications					
Machine type	2582-32x, 42x, 62x, 82x				
Form factor	Minitower (optional 4U Rack)				
Processor type	Quad-core Xeon E3 (12xx) 2.2GHz 1220L (CTO), 2.4GHz 1260L (CTO), 3.1GHz 1220 (62x), 3.2GHz 1230 (CTO), 3.3GHz 1240 (CTO), 3.4GHz 1270 (82x), 3.5GHz 1280 (CTO)		Dual-core Core i3 (21xx) 3.1GHz 2100 (42x), 3.3GHz 2120 (CTO), 3.4GHz 2130 (CTO)		Dual-Core Pentium (Gxxx) 2.6GHz G620 (CTO), 2.7GHz G630 (CTO), 2.7GHz G830 (CTO), 2.8GHz G840 (CTO), 2.9GHz G850 (32x), 3.0GHz G860 (CTO)
Maximum processor power draw	95W (1280 via CTO)	80W (62x, 82x, and 1230/1240 via CTO)	65W (32x, 42x, and 2120/2130/G620/G630/G830/G840/G860 via CTO)	45W (1260L via CTO)	20W (1220L via CTO)
Front-side bus speed	1333MHz / 1066MHz				
# of processors standard / maximum	1 / 1				
Internal L3 cache	8MB (shared)—62x, 82x, and		3MB (shared)—32x, 42x, and		

x3100 M4 Specifications			
	1230/1240/1280 via CTO		1220L/1260L/2120/2130/G620/G630/ G830/G840/G860 via CTO
Chipset	Intel C202		
Standard memory ⁴	4GB (1 x 4GB)—82x		2GB (1 x 2GB)—32x, 42x, 62x
Maximum memory	32GB (4 x 8GB UDIMMs)		
Standard memory type	PC3-10600 (1333MHz) DDR3 ECC		
Maximum memory access rate	1333MHz (32x, 42x, 62x, 82x, and 1220L/1230/1240/1260L/1280/2120/2130/ G830/G840/G860 via CTO)		1066MHz (G620/G630 via CTO)
Memory interleaving	Yes (two-way, with 2 or 4 DIMMs)		
DIMM capacities supported	1GB, 2GB, 4GB, 8GB UDIMMs		
# of DIMM sockets total / available	4 / 3		
# of DIMMs supported	1, 2, or 4		
Chipkill protection supported	No		
# of drive bays total / available	6 / 5 (optical drive installed) via CTO		
# of 3.5-inch HDD drive bays total / available	4 / 4		
# of 5.25-inch bays total / available	2 / 1 (optical drive installed)		
Maximum HDD capacity	12TB (4 x 3TB)		
HDD capacities supported	3.5-inch SATA II 250 or 500GB, 1 or 3TB — 7,200 RPMs		
# of HDDs standard	None		
# of optical drives standard / optional	1 DVD-ROM (in dedicated 5.25" bay) / DVD multiburner		
# of floppy drives standard	None (optional USB)		
Data backup supported	1 half-high (5.25-inch or 3.5-inch) DDS-5 or DDS-6 tape drive (internal USB); or 1 RDX Removable Disk Cartridge drive (internal or external USB); or IBM Half-High 400/800GB LTO-3 (internal SAS) ; or IBM Half-High LTO-4 (internal SAS)		
Internal backup standard	None		
Disk drive technology	Simple-swap SATA II		
Integrated disk controller	4-port SATA II (via chipset)		
Integrated RAID controller	ServeRAID C100 for System x		
Optional RAID controllers supported	3Gbps ServeRAID-BR10iL V2 (no cache)— RAID-0/1/1E (42x, 82x)	6Gbps ServeRAID-M1015 (no cache)—RAID-0/1/10; optional RAID-5/50 (all models)	6Gbps ServeRAID-M5014 (256MB cache)—RAID- 0/1/10/5/50
External disk drives supported	No		
# of adapter slots total / available	4 / 4		
# of PCIe x16/x8 Gen 2 slots (8GBps) ⁵	1 full-height/half-length		

⁴ Maximum memory and disk capacity may require the replacement of standard components with the largest supported component available.

x3100 M4 Specifications		
# of PCIe x8/x8 Gen 2 slots (8GBps) ⁵	1 full-height/full-length	
# of PCIe x4/x4 Gen 2 slots (2GBps) ⁷	1 full-height/full-length	
# of PCIe x1/x1 Gen 2 slots (1GBps) ⁸	1 full-height/full-length	
# of video ports	1 (rear)	
Video controller	Matrox G200eV graphic controller integrated in IMM2	
Video memory	16MB DDR2 SDRAM	
Maximum video resolution at 32-bit color	1600 x 1200 x 32-bit color at 75Hz	
Gigabit Ethernet controllers	2 x single-port Broadcom BCM82574L	
# of Gigabit Ethernet ports	2 (rear)—1 shared for systems management	
# of serial ports	1 (rear)	
# of mouse ports	None (USB-attached)	
# of keyboard ports	None (USB-attached)	
# of USB 2.0 ports	8; 6 <i>external</i> ports (2 front, 4 rear); plus 2 <i>internal</i> connectors for tape drive, RDX Removable Disk Cartridge drive, or USB flash drive containing a hypervisor	
Integrated systems management controller	IMM2	
Predictive Failure Analysis support	Yes	
# of power supplies standard / maximum	1 / 1	
Power supply type standard	300W fixed 80 Plus Bronze (82x)	350W fixed (42x, 62x)
Hot-swap/redundant power supported	No	
# of fans/blowers standard / maximum	1 / 1 fan	
Hot-swap/redundant fans supported	No	
Heat emitted: minimum / maximum BTUs/Watts per hour	324 / 1484 BTUs (model-specific); 95 / 435 Watts	
Maximum altitude	7,000 ft; 2,133 m	
Operating temperature range	50 – 95° F; 10 – 35° C (up to 3,000 ft / 914.4 m); 50 – 90° F; 10 – 32° C (3,000 ft to 7,000 ft / 914.4m to 2,133m)	
Operating humidity range	8-80%	
Dimensions (HWD) / weight	14.17" (260mm) H 7.08" (180mm) W 18.9" (480mm) D	22 (minimum) – 37.5 lb (maximum) 13 – 28.7 kg
Operating systems supported	Microsoft Windows Server 2008 & R2 (Standard/Enterprise Editions) 32-bit and 64-bit, Microsoft Small Business Server 2008 Standard/Premium Edition 64-bit, RHEL 5 32-bit, RHEL	

⁵ x16/x8 Gen 2 slots can accept x1, x4, x8, or x16 Gen 1 or Gen 2 adapters running at x1, x4, x8 or **x8** throughput, respectively.

⁶ x8/x8 Gen 2 slots can accept x1, x4 or x8 Gen 1 or Gen 2 adapters running at x1, x4 or x8 throughput, respectively.

⁷ x4/x4 Gen 2 slots can accept x1 or x4 Gen 1 or Gen 2 adapters running at x1 or x4 throughput, respectively.

⁸ x1/x1 Gen 2 slots can accept x1 Gen 1 or Gen 2 adapters running at x1 throughput, respectively.

x3100 M4 Specifications	
	5 64-bit with or without Xen, RHEL 6 32-bit and 64-bit; SLES 10/11 32-bit, SLES 10/11 64-bit with or without Xen, VMware vSphere Hypervisor 4.1
Length of limited warranty	1 year (parts and labor) ⁹

The Bottom Line

The x3100 M4 is an extremely powerful value system, incorporating leading-edge industry-standard features and adding IBM-unique innovations:

Price/Performance

- **Low-cost/high-throughput processors** — A choice of one **3.1** or **3.4GHz quad-core** Xeon processor, **3.1GHz dual-core Core i3** processor, or **2.9GHz Pentium G850** processor standard, or other Xeon, Core i3, or Pentium processors via CTO
- **Generous cache** — **8MB** or **3MB** of L3 processor cache (processor-specific)
- **Fast memory** — **1333MHz PC3-10600 DDR3** ECC memory standard with **two-way interleaving**
- **Fast memory access** — High-speed (**1333MHz** or **1066MHz**—processor-specific) access between the processor and memory
- **Integrated RAID support** — **ServeRAID-C100** (model-specific), offering software **RAID-0/1** support standard; optional *hardware* RAID controllers support RAID-0/1/10/5
- **Fast disk technology** — Integrated **SATA II** controller (model-specific) and drives
- **Fast communications** — **Two** integrated **single-port Gigabit Ethernet** controllers
- **Fast I/O** — **Four** PCIe adapter slots, including two **x8** slots

Flexibility

- **Large memory capacity** — Up to **32GB** of **DDR3 UDIMM** memory, using **4** DIMMs
- **Large disk capacity** — Up to **12TB** of internal SATA storage
- Internal **tape** or internal/external **RDX Removable Disk Cartridge** backup storage
- **High-performance external expansion** — **Six external** 480Mbps **USB 2.0** ports (two front, four rear), plus **one internal USB 2.0** port for tape or **RDX Removable Disk Cartridge drive**, or USB flash drive containing a hypervisor
- **Hardware RAID support** standard in selected models; firmware RAID standard in other models
- **Four available** adapter slots:
 - ☐ **One** physical **x16/electrical x8 PCIe Gen 2** high-speed slot
 - ☐ **One** physical **x8/electrical x8 PCIe Gen 2** high-speed slot
 - ☐ **One** physical **x4/electrical x4 PCIe Gen 2** high-speed slot
 - ☐ **One** physical **x1/electrical x1 PCIe Gen 2** high-speed slot
- Integrated **DVD-ROM** drive
- Minitower, convertible to a **4U** rack unit

Manageability, Serviceability and Availability

- **IMM2**
 - ☐ **IPMI 2.0** support
- **IBM Systems Director**
- **IBM ServerGuide**
- **IBM ToolsCenter**
- **Light path diagnostics**
- **TPM 1.2** support
- Support for **highly available hardware-based RAID-1/10** arrays standard (model-specific)
- **ECC memory protection**
- **PFA support**
- **Efficient cooling**

⁹ For terms and conditions or copies of the IBM Statement of Limited Warranty, call 800-772-2227 in the U.S. In Canada call 800-426-2255. IBM makes no representation or warranty regarding third-party products or services including those designated as ServerProven or ClusterProven. Telephone support may be subject to additional charges. For warranties including onsite labor, a technician is sent after IBM attempts to resolve the problem remotely. International warranty service is available in any country in which this product is sold.

- Toolless chassis

Server Comparison Chart

The following table shows the suggested uses for the respective IBM System x tower servers, including comparisons of the uses for which each server is best suited:

		Requirements										Towers					
Theme	Key Workloads	Scalability	Floating Point Performance	Memory Throughput	Integer Performance	I/O and Storage	Density	High Availability	Systems Management	Security	Distributed Deployment	 x3100 M3/M4	 x3200 M3	 x3400 M3	 x3500 M3		
HPC	Cluster / HPC																
	Modeling & Simulation																
	High Performance DB																
	Business Intelligence																
Web 2.0 / Web 3D	Search																
	Content																
	Communities																
	Commerce																
	Collaboration																
Business Applications	ERP/SCM											○	○	◐	●		
	CRM											○	◐	◐	●		
	Hosted Client											○	◐	◐	●		
	Point of Sale											◐	●	◐	●	○	
	Branch Office											◐	●	●	●	●	
Infrastructure Applications	Virtualization											○	○	○	●		
	Business Continuity											○	○	○	◐		
	Database											○	○	◐	●		
	Email/Collaboration											◐	●	◐	●		
	Security											◐	●	◐	●		
	Web Serving											◐	●	◐	●		
	File & Print											●	●	●	◐		

Important



Nice to Have



Can do without



Best



Better



Good





For More Information

IBM System x Servers	http://ibm.com/systems/x
IBM Systems Director Service and Support Manager	http://ibm.com/support/electronic
IBM System x and BladeCenter Power Configurator	http://ibm.com/systems/bladecenter/resources/powerconfig.html
IBM Standalone Solutions Configuration Tool	http://ibm.com/systems/x/hardware/configtools.html
IBM Configuration and Options Guide	http://ibm.com/systems/x/hardware/configtools.html
IBM ServerProven Program	http://ibm.com/systems/info/x86servers/serverproven/compat/us
Technical Support	http://ibm.com/server/support
Other Technical Support Resources	http://ibm.com/systems/support

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September 2011
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MB, GB and TB = 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, when referring to storage capacity. Accessible capacity is less; up to 3GB is used in service partition. Actual storage capacity will vary based upon many factors and may be less than stated.

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will depend on considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

Maximum internal hard disk and memory capacities may require the replacement of any standard hard drives and/or memory and the population of all hard disk bays and memory slots with the largest currently supported drives available. When referring to variable speed CD-ROMs, CD-Rs, CD-RWs and DVDs, actual playback speed will vary and is often less than the maximum possible.

XSO03136-USEN-00